

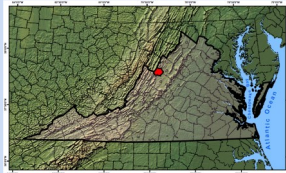


United States Department of Agriculture

TODD LAKE DAM (Upper North River Watershed, Augusta County)

THE WATERSHED SHORT STORY

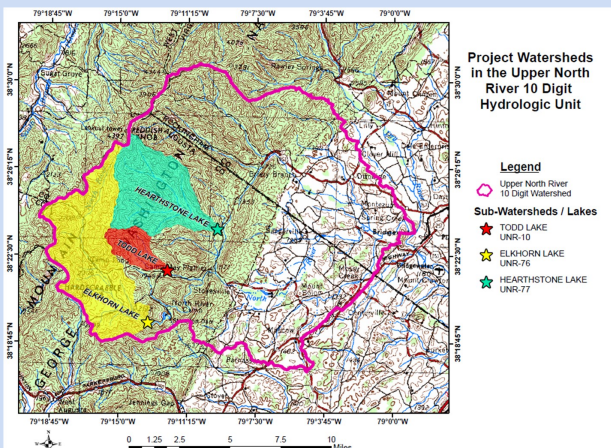
The Soil Conservation Service (SCS) wrote the original Watershed Work Plan for the Upper North River Watershed for the sponsor, the Shenandoah Valley Soil Conservation District, in 1960.



The plan called for the construction of three flood control dams in the headwaters of the North River. These three structures are known today as Todd Lake (built in 1963), Elkhorn Lake (built in 1965), and Hearthstone Lake (built in 1966).

The Headwaters SWCD took on the responsibility for the Operation and Maintenance (O&M) of Todd Lake and Hearthstone Lake in 1993. The City of Staunton owns and maintains Elkhorn Lake.

When Todd Lake was built, it was considered to be a significant hazard structure with the potential for loss of life. Due to downstream development and the increased threat of loss of life, the Todd Lake dam was reclassified as a high hazard structure in 2008. The dam needs to be rehabilitated to meet the more stringent criteria of a high hazard dam.



EXISTING SITE INFORMATION:

- Drainage area of lake: 3.86 square miles
- Dam height: 64 feet
- Dam crest length: 987 feet
- Surface area at normal pool: 5.8 acres
- Surface area at flood pool: 32.5 acres
- Storage in normal pool: 688 acre-feet



Todd Lake, looking upstream at the pool and riser. The IFLOWS gage is in the foreground.

DESCRIPTION OF PROBLEMS:

- The dam has been reclassified from a significant hazard structure to a high hazard structure.
- The auxiliary spillway does not have the capacity, stability, or integrity to pass the water volume associated with the Probable Maximum Precipitation (PMP).
- The principal spillway riser needs to be replaced.

FUNDING:

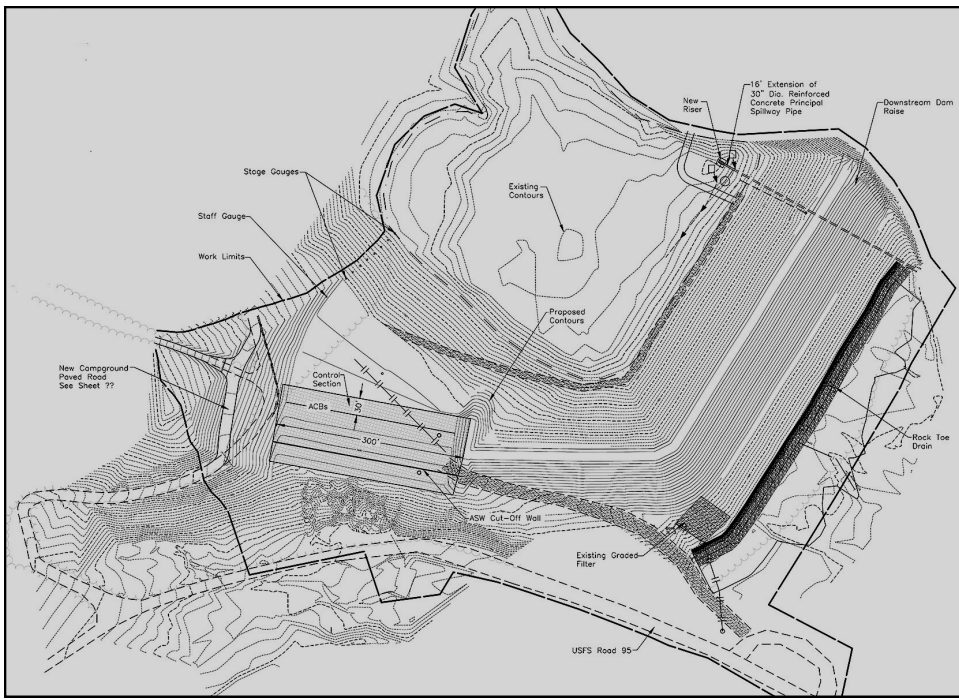
The USDA Natural Resources Conservation Service will pay 65 percent of the project costs and up to 100 percent of the construction costs. The sponsors will be responsible for 35 percent of the project costs.

SPONSORS:

Headwaters Soil and Water Conservation District
Augusta County Board of Supervisors

DAM REHABILITATION SCHEDULE:

The Todd Lake Plan was finished in September 2012. The plan was authorized and funded for design and construction. Construction is expected to begin in early 2015 and be completed before the end of the year. Once design and construction are concluded, the dam's flood protection, recreation, and water quality benefits will continue for the next 50 years.



Plan view of proposed rehabilitation.



Example of concrete cut-off wall installation.



ACB installation.

Required characteristics of an auxiliary spillway:

Capacity: the combination of storage and auxiliary spillway size needed to safely handle the PMP.

Stability: the resistance of the soil to surface erosion.

Integrity: the strength of the underlying soil and rock material.

Flood control dams, such as Todd Lake, are designed to store flood water during storm events and gradually release it into the stream over several days through the principal spillway pipe.

This principal spillway pipe regulates the water level in the dam on a daily basis and controls the rate at which the detained storm water is released from behind the dam. Excess water that cannot be stored in the reservoir exits through the grassy area at the end of the dam known as the auxiliary spillway.

The drawing above is a sketch of the proposed solution to the auxiliary spillway problem. The plan includes the following rehabilitation items:

- The top of the dam will be raised 2.7 feet with earthfill and reseeded. The auxiliary spillway will be widened from 200 to 300 feet. This will increase the capacity of the auxiliary spillway enough to safely pass the flows from the PMP storm event. The level section (control section) will be moved upstream.

- A concrete retaining wall will be installed 75 feet downstream of the level section to prevent a dam breach.
- The level and constructed outlet sections will be covered with articulated concrete blocks (ACBs) to prevent surface erosion in the auxiliary spillway. The blocks will be cabled together and completely covered with soil and grass, so they will not be visible once the project is completed. The above photo shows the blocks as they will be installed.
- The training dikes on the embankment-side of the auxiliary spillway will be extended upstream and downstream to direct the water away from the dam.
- The concrete principal spillway riser and gate will be replaced with new materials.

Flood control dams also serve to trap sediment and keep it from moving downstream. In the 49 years since this dam was built, it has trapped about 9 acre-feet of sediment.

As of 2012, there was enough room in the reservoir to retain sediment for the next 253 years. Therefore, sediment removal will not be included as part of the rehabilitation of the dam.